

MeV-Scale Sterile Neutrino Dark Matter and Future Detection

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Sterile neutrinos are well-motivated candidates for dark matter. In particular, sterile neutrino dark matter in the MeV mass range has recently attracted increasing attention due to the prospects of future indirect detection experiments. In this work, we focus on the Compton Spectrometer and Imager (COSI) as a next-generation gamma-ray detector and investigate the detectability of MeV-scale sterile neutrino dark matter.

By exploiting the complementary sensitivity of the 511 keV line associated with positronium decay and a monochromatic gamma-ray line from radiative decays, COSI is expected to explore previously unexplored regions of parameter space for MeV-scale sterile neutrino dark matter. Furthermore, we show that within part of this parameter space, COSI has the capability to simultaneously probe sterile neutrino dark matter through both the 511 keV and monochromatic gamma-ray signals.

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